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(54) Title: Drink material which includes gamolenic acid

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DETAILED EXPLANATION

1. TITLE OF THE INVENTION

Drink material which includes gamolenic acid

2. CLAIMS

Claim 1

A drink material characterized by the fact that gamolenic acid and esters of gamolenic acid have been added to it.

Claim 2

The drink material according to Claim 1 which includes gamolenic acid and esters of gamolenic acid in the amount of 0.001-1.0 % in a liquid body as a percentage by weight.

Claim 3

The drink material according to Claim 1, wherein the esters of gamolenic acid are gamolenic acid methyl and gamolenic acid ethyl.

Claim 4

The drink material according to Claim 1 comprising a triglyceride wherein in a molecular inclusion, the constituent ingredients of the esters of gamolenic acid include, at a minimum, one molecule of gamolenic acid.

Claim 5

The drink material according to Claim 1 wherein the gamolenic acid and esters of gamolenic acid are enclosed by cyclodextrine.

3. DETAILED EXPLANATION OF THE INVENTION

[Field of the Invention]

The present invention relates to a drink agent to which has been added a triglyceride which includes gamolenic acid as well as gamolenic acid esters and gamolenic acid as the constituent ingredients.

[Prior Art and Related Problems]

The gamolenic acid (cis. cis. cis-6,9,12-octadecatrienic acid) is a fatty acid of the carbon number 18 having a non-saturated bond of the system type in the carbon of the 6th, 9th, and 12th from the carbonic acid end, its presence being recognized in mother's milk and moon flower seeds. In a living body, it is induced by means of unsaturated enzymes (Δ - 6 - desaturase) from linoleic acid comprising essential fatty acids. Subsequently it becomes *bisuhomo* gamolenic acid, and is converted to prostagladins and leucotriene, which demonstrate various physiological activity within the living body. In this metabolism path, the 1st bound factor is an unsaturated enzyme, the movement of which is further weakened by diabetes, excessive alcohol, and aging. Also, the generation of prostagladins is suppressed by the reduction of enzyme activity, and obstacles to

health are known to occur. However, gamolenic acid is effective as a nutritional element used for the treatment of these obstacles. Gamolenic acid is effective in the treatment of premenstrual syndrome, heart patients, for the reduction of cholesterol within the blood, high blood pressure, eczema, allergies, and hangovers.

[Problem Resolution Means]

The object of the present invention to provide a drink agent which includes gamolenic acid that can be easily taken as a part of daily dietary life in order to resolve the problem of generation of obstacles to health caused by the poor presence of gamolenic acid constituents.

Constituents

The present invention provides a drink material to which has been added triglycerides which include gamolenic acid as well as gamolenic acid esters and gamolenic acid as the primary constituent ingredients.

As indicated above, the gamolenic acid is greatly included in mother's milk, in addition to which it is known to be included in moon flower seeds. Presently, one source of gamolenic acid is moon flower seeds. However, the production of moon flower seeds is low. Accordingly, there is exploration of alternative gamolenic acid source material. With systemic fungi or drugs, gamolenic acid is reported to be included in fatty substances. However, there is not included an amount sufficient to satisfy the fatty substance productivity and the gamolenic acid included amount.

In the Industrial Technical Hospital Chemical Research Institute of the Ministry of Trade and Industry, research continued on oily fat production from each type of fungus with the objective of developing an oily fat resource which could substitute for animal and plant fatty oils. Among these, fungi in the *Mortierella* family showed a high inclusion of fatty substances. In addition, gamolenic acid was also discovered to be included in a high proportion in the fatty acids. Furthermore, in a portion of the fungi of the *Mortierella* family, by using a culture which has highly concentration carbon such as glucose and sugar, it becomes possible to culture fungi having high fatty concentrations to a level which has not been possible heretofore. Fungus oils produced in this manner include gamolenic acid to the same level as found in moon flower seeds.

From the oily fats produced by the fungus, trilycerides can be produced which include as the primary constituent refined gamolenic acid of the same quality as dietary oils. In addition, by using the fungus produced oily fats as the source material, gamolenic acid and gamolenic acid esters can be produced at low cost.

Moreover, the refinement of triglycerides which include gamolenic acid obtained in the manner described above is accomplished by ordinary means. For example, water is added to rough glycerides extracted from a fungus, and processing is performed in which the gummy substance forming the primary component of a phosphorous fatty substance is hydrated, and which swells and congeals. Gum removal processing is performed, with the oil of the removed extracted gum being extracted by chemical processing using an alkali and acid drug. After acid removal, namely, after the removal of the phosphorus fatty substances and the separated fatty acid, it is heated in a vacuum along with the adhesive of active kaolin, and the color pigments and other

minute components are by adhesion removed. Furthermore, low grade aldehyde ketones comprising the aromatic components are removed along with the separated fatty acids, thereby obtaining refined glyceride oils.

With the present invention, refined triglycerides which include refined gamolenic acid as well as gamolenic esters and gamolenic acid in the manner described, may be added in their existent state to the drink material. However, generally it is difficult to mix in a uniformly stabilized state. Therefore, as a result of various studies by the inventors to overcome this problem, a way has been discovered to achieve this objective by adding refined triglycerides containing gamolenic acid as well as gamolenic acid esters and gamolenic acid to the drink material after it has been made into an enclosed product of cyclodextrine. The cyclodextrine used by the present invention may be either of the α , β , or γ type. However, α or β type cyclodextrine is preferable.

According to the research of the inventors, triglycerides which include gamolenic acid as well as gamolenic acid esters and gamolenic acid are found to obtain enclosed compounds of cyclodextrine by ordinary means. In other words, by adding triglycerides which contain gamolenic acid, as well as gamolenic acid esters and gamolenic acid in a fixed amount to a saturation or supersaturation of cyclodextrine, an enclosed substance can be obtained as a precipitate by agitation for several ten-minute periods. In addition, after adding water to cyclodextrine to form a slurry, adding triglycerides which include the necessary amount of gamolenic acid as well as gamolenic acid esters and gamolenic acid, enables obtaining the target enclosed substance by thorough shaking using an agitator.

In the present invention, gamolenic acid constituents added to a drink material are added in the amount of 0.01-1 % in a liquid body as a percentage by weight. The drink material need not be a particular material, but no matter what the composition, the cyclodextrine enclosed substance may be easily dispersed within the solution. The drink material which includes gamolenic acid components, in anticipating the preventative effects relating to heart disease and high blood pressure and the like, ordinarily as a part of daily dietary life, enables a reduction in hangovers and pre-menstrual syndrome.

[Embodiments]

The present invention will now be explained in further detail with reference to the following embodiments.

Embodiment 1

The amount of 100ml of an aqueous solution which is 50% ethanol is added at 60°C, and while being agitated, β -cyclodextrine is added in the amount of 9g and dispersed. To this is added 1g of gamolenic acid, and while continuously agitating, it is gradually cooled to 4°C. After obtaining a precipitate by means of centrifugation, it is washed with acetone, thereby obtaining a cyclodextrine powder which includes gamolenic acid in the amount of approximately 10 % as a percentage by weight.

The cyclodextrine powder in which gamolenic acid is enclosed is added so that the gamolenic acid within the drink material formed from the composition shown in Table 1 has a percentage

by weight of 0.05 %. At this time, dispersion of the cyclodextrine which encloses gamolenic acid within a liquid is easily accomplished, and a product is obtained in which the gamolenic acid is substantially uniformly dispersed.

Table 1

NaCl	0.8 g/l
KC 1	0.4
CuCl ₂	0.2
MgCl ₂	0.1
Citric acid	1.4
Sodium citrate	1.0
L sodium glutamine	0.05
Glucose	25
Sugar	20
Fruit juice	50

Embodiment 2

One hundred ml of an aqueous solution having a 50 percent ethanol component is added at 60°C, and while being agitated, 9g of β -cyclodextrine is added and dispersed. To this is added 1.5 g of gamolenic acid ethyl, which is agitated for 4-5 hours and cooled until it gradually reaches 4°C. After recovering a precipitate by means of centrifugation, it is washed with acetone, thereby obtaining cyclodextrine powder which contains a 10 percent inclusion of gamolenic acid ethyl.

Cyclodextrine powder which encloses gamolenic acid ethyl is added so that the gamolenic acid ethyl in the drink material formed from the composition shown in Table 2 amounts to 0.05% as a percentage by weight, thereby obtaining a product in which the gamolenic acid ethyl is uniformly dispersed and mixed.

Table 2

L – ascorbic acid	1	g/l
L – aspartic acid	0.05	
DL – threonine	0.01	
Glycine	0.1	
DL-alanine	0.1	
L – ligin HC l	0.05	
Natural caffeine	2.5	
Glucose	40	
Sugar	30	
Citric acid	2.3	
Malic acid	0.5	
Sodium (koahnic) acid	0.5	
Sodium citrate	0.8	

Embodiment 3

To 10g of β cyclodextrine is added 10 l of water. After mixing, 5ml of triglyceride is added, which includes 7.0% gamolenic acid, following which agitation is accomplished for 15 minutes with a homogenizer. Subsequently, washing is performed twice with ethanol, and a precipitate is collected. Low pressure drying is performed at room temperature, and a white powder is obtained which includes a triglyceride in the amount of 30 % as a percentage by weight, having a gamolenic acid inclusion.

The cyclodextrine powder in which the triglyceride is enclosed is added so that the gamolenic acid constituent inclusion within the drink material formed from a composition shown in Table 1 amounts to 0.05 % as a percentage by weight. At this time, the dispersion of the cyclodextrine powder in which triglycerides have been enclosed within a liquid is extremely easy, and a product is obtained in which there is a uniform dispersion of triglycerides having a gamolenic acid inclusion.

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